JEE MAINS 10 APRIL 2019 - PAPER 1 SHIFT 2

PHYSICS

MEMORY BASED

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Ques No.	Question
1 - 9525864	**JEE MAINS 10 APRIL 2019 - PAPER 1 SHIFT 2 - MEMORY BASED - PHYSICS** If X is capacitance and Y is the magnetic field which are related by $X = 2aY^2$. Dimension of a will be:- (A) $\left[M^{-1}L^{-2}T^{3}Q^{-3}\right]$ (B) $\left[M^{-3}L^{-2}T^{4}Q^{4}\right]$ (C) $\left[M^{-2}L^{-1}T^{3}Q^{-3}\right]$ (D) $\left[M^{-2}L^{-2}T^{3}Q^{-2}\right]$ **CORRECT OPTION: B** Watch Free Video Solution on Doubtnut
2 - 9525865	**JEE MAINS 10 APRIL 2019 - PAPER 1 SHIFT 2 -**

MEMORY BASED - PHYSICS

Sphere of inner radius a and outer radius b is made of p uniform resistivity find resistance between inner and outer surface

(A) $\frac{p}{4\pi}\left(\frac{1}{a}-\frac{1}{b}\right)$

(B) $\frac{p}{2\pi}\left(\frac{1}{a}-\frac{1}{b}\right)$

(C) $\frac{p}{3\pi}\left(\frac{2}{a}-\frac{1}{b}\right)$

(D) $\frac{p}{2\pi}\left(\frac{2}{2a}-\frac{1}{b}\right)$

CORRECT OPTION: A

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3 - 9525866

JEE MAINS 10 APRIL 2019 - PAPER 1 SHIFT 2 - MEMORY BASED - PHYSICS

A particle of mass $20gm$ is moving with velocity $1m/s$. It penetrates $20cm$ wooden block (fixed) with average force $2.5 \times 10^{-2}N$. Find out speed particle when it come out from blocl.

(A) $\frac{1}{\sqrt{3}}m/s$

(B) $\frac{1}{\sqrt{5}}m/s$

(C) $\frac{1}{\sqrt{5}}m/s$

(D) $\frac{1}{\sqrt{7}}m/s$

CORRECT OPTION: C

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Pressure of 1 mole ideal is given by

$P - P_0\left[1 - \frac{1}{2}\left(\frac{V_0}{V}\right)^2\right]$,brgt If volume of gas change from V to $2V$. Find change in temperature.

(A) $\frac{2P_0V}{R} + \frac{P_0V_0^2}{4V}$

(B) $\frac{3P_0V}{R} + \frac{P_0V_0^2}{4V}$

(C) $\frac{P_0V}{4R} + \frac{P_0V_0^2}{4V}$

(D) $\frac{P_0V}{R} + \frac{P_0V_0^2}{4V}$

CORRECT OPTION: D

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5 - 9525868

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(A) A cylindrical wire has breaking stress of $376Mpa$. If a force of $400N$ is applied on wire then maximum diameter of wire such that it does not break :-

(B) $2.1mm$

(C) $3.1mm$

(D) $1.1mm$

CORRECT OPTION: A::B

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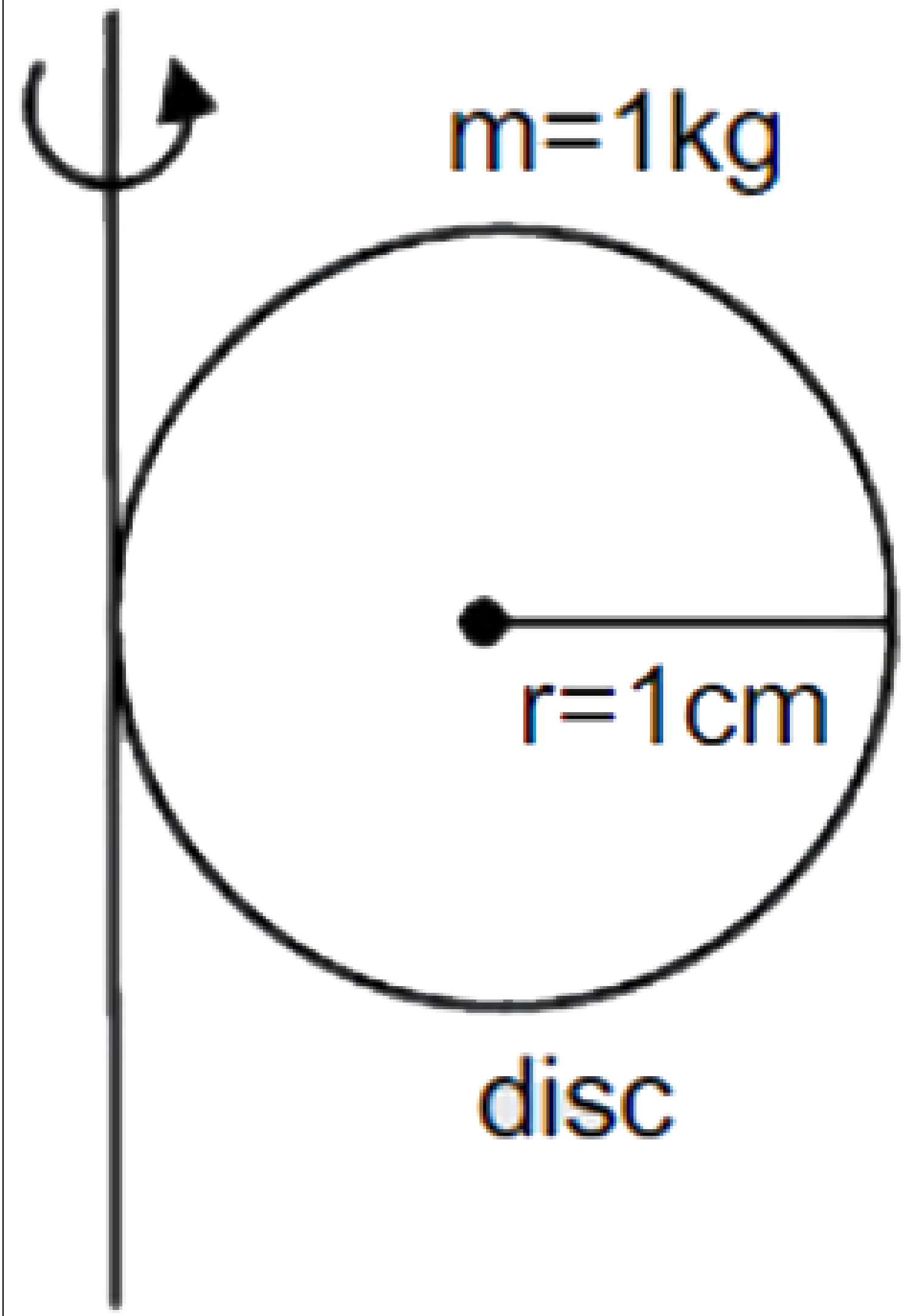
6 - 9525869

JEE MAINS 10 APRIL 2019 - PAPER 1 SHIFT 2 - MEMORY BASED - PHYSICS

Find torque required so that a coin of mass $1kg$ rotates 25 revolution in 5 sec starting from rest.



(A) $6\pi \times 10^{-4} Nm$

(B) $5\pi \times 10^{-4} Nm$

(C) $7\pi \times 10^{-4} Nm$

(D) $9\pi \times 10^{-4} Nm$

CORRECT OPTION: B

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A sound source is moving with speed $50 m/s$ towards a fixed observer. Frequency observed by observer is $1000 Hz$. Find out apparent frequency observed by observer when source is moving away from observer (Speed of sound $= 350 m/s$)

(A) $750 Hz$

(B) $950 Hz$

(C) $550Hz$

(D) $350Hz$

CORRECT OPTION: A

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Find the time after which current in the circuit becomes

$80\ \%$ of its maximum value

(A) $\frac{\ln 2}{100}$

(B) $\frac{\ln 3}{100}$

(C) $\frac{\ln 5}{100}$

(D) $\frac{\ln 6}{100}$

CORRECT OPTION: C

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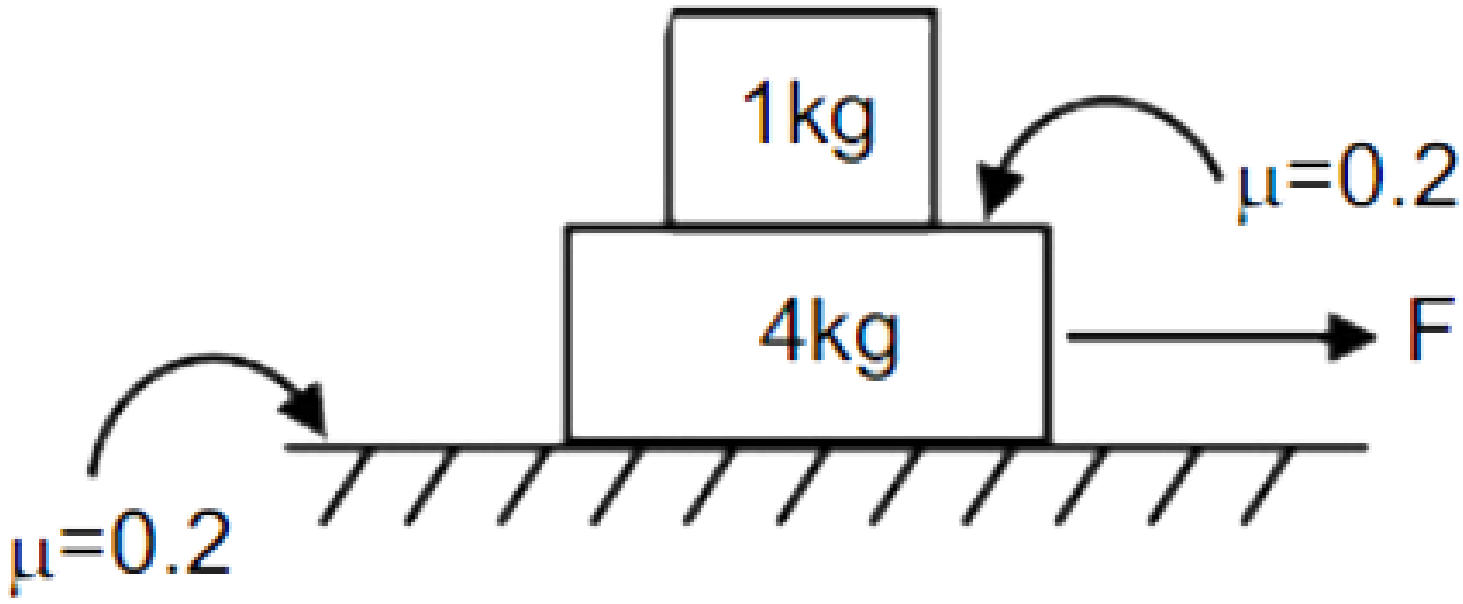
There are two block as shown in the figure of masses $1kg$ and $4kg$. Friction coefficient between any two surfaces are 0.2 then find maximum value of horizontal force F so that both blocks moves together.



(A) $5N$

(B) $10N$

(C) $15N$

(D) $20N$

CORRECT OPTION: D

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10 - 9525874

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A block of side $0.5m$ is $30\,\%$ submerged in a liquid of density $1gm/(cc)$. Then find mass of an object placed on block for complete submergence.

(A) $87.3kg$

(B) $85.3kg$

(C) $82.3kg$

(D) $80.3KG$

CORRECT OPTION: A

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Magnetic moment of a current carrying square loop be M. If it is converted in form of circle and same current is passed through it then find the new magnetic moment.

(A) $\frac{M}{4\pi}$

(B) $\frac{4M}{\pi}$

(C) $\frac{M}{3\pi}$

(D) $\frac{5M}{6\pi}$

CORRECT OPTION: B

12 - 9525876

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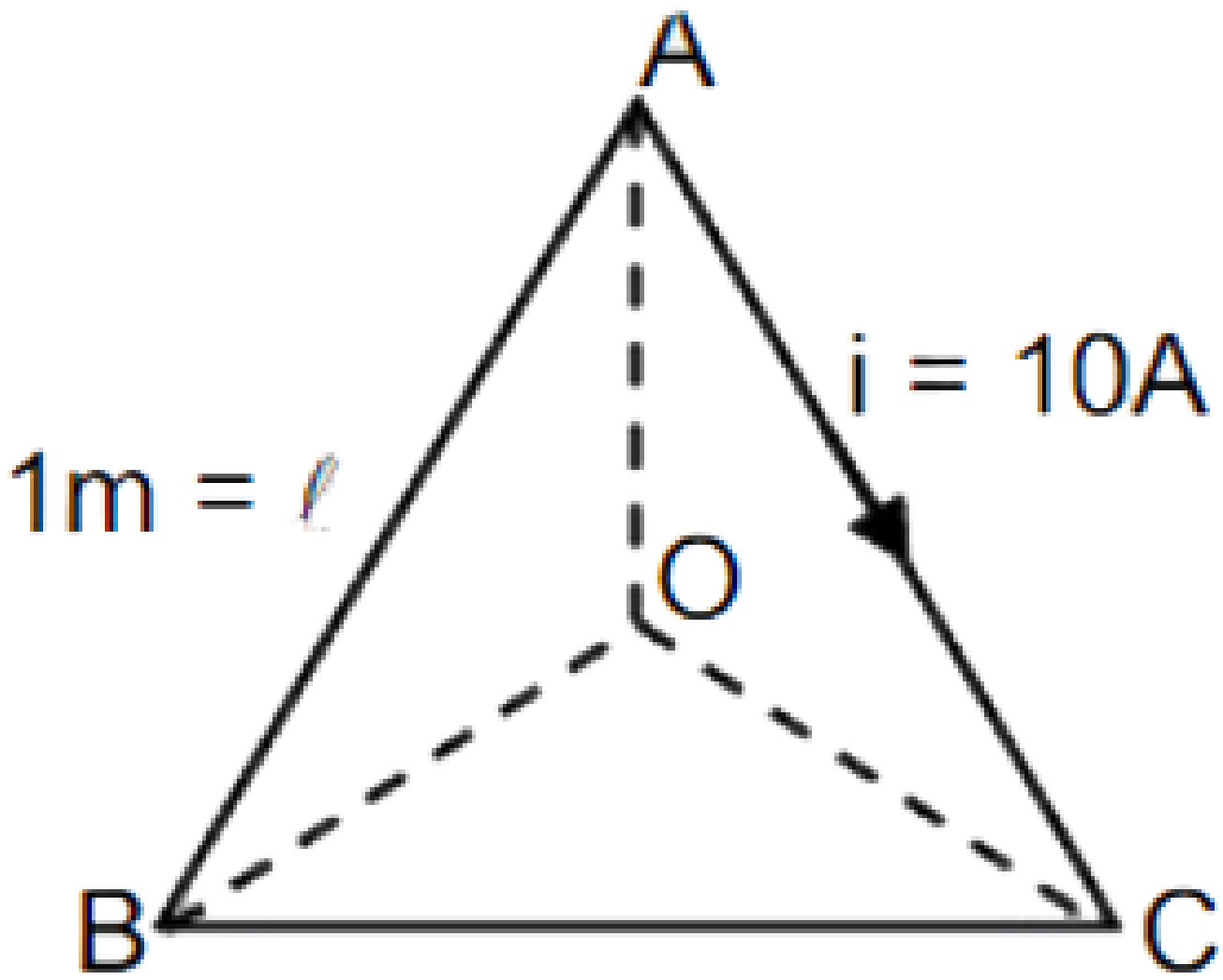
The graph of manification v/s image distance of a thin lance is given. Its focal length will be -



(A) $f = \frac{-a}{c}$

(B) $f = \frac{-b}{c}$

(C) $f = \frac{-c}{b}$

(D) `None of these

CORRECT OPTION: B

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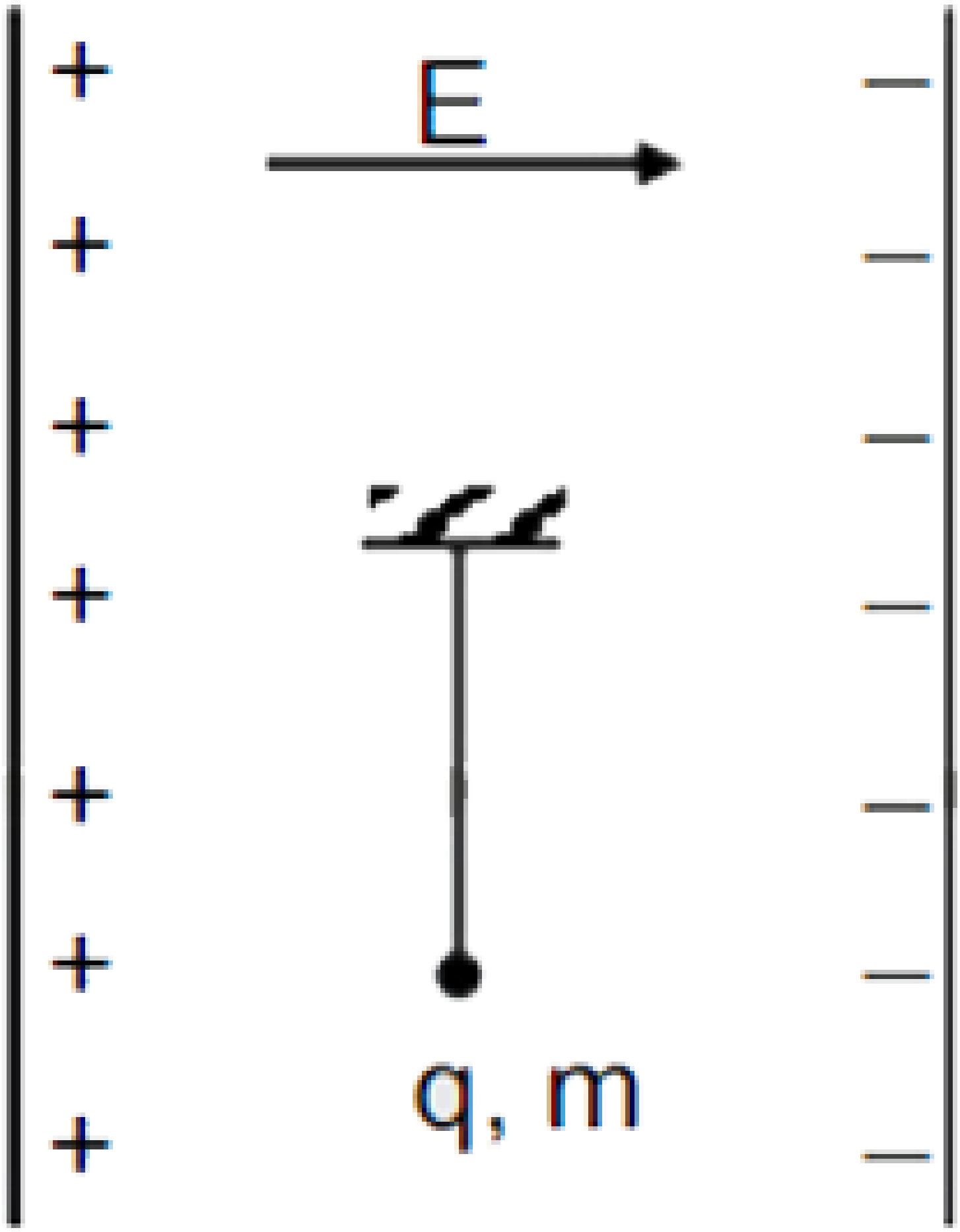
A current of $10A$ is flowing in a equilateral triangle of side length $l = 1M$ as shown in figure. The magnetic field at center of triangle is:



(A) $8 \times 10^{-6} T$

(B) $9 \times 10^{-5} T$

(C) $9 \times 10^{-6} T$

(D) $10^{-5} T$

CORRECT OPTION: C

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14 - 9525878

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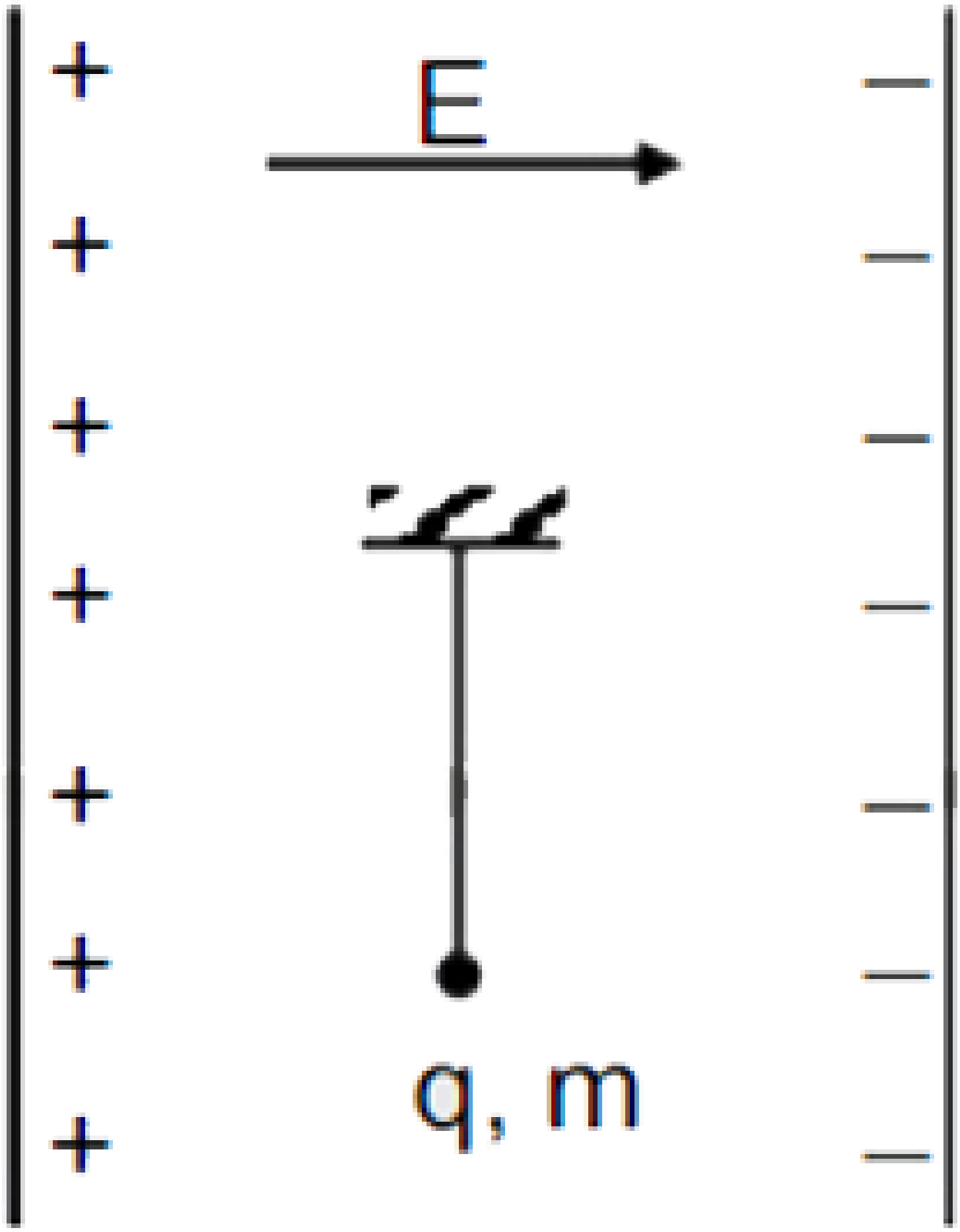
A particle of mass $'m'$ and charge $'q'$ is suspended from the ceiling with the help of an insulating wire of length $'l'$. It is placed in an uniform electric field as shown in figure. Then the time period of oscillation is



(A) $\sqrt{\frac{l}{\sqrt{g^2+\left(\frac{qE}{m}\right)^2}}}$

(B) $2\pi\sqrt{\frac{l}{\sqrt{g^2+\left(\frac{qE}{m}\right)^2}}}$

(C) $2\pi\sqrt{\frac{l}{\sqrt{g^2+\left(\frac{qE}{m}\right)}}}$

(D) $2\pi\sqrt{\frac{l}{\sqrt{g^2-\left(\frac{qE}{m}\right)^2}}}$

CORRECT OPTION: B

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A brass rod of length $1M$, area $1mm^2$ and Young's modulus $120\times10^9N/m^2$ is connected with steel rod of length $1m$, area $1mm^2$ and Young's modulus $60\times10^9N/m^2$. Then the net stress so that extension of system is $0.2mm$

(A) $2\times10^6N/m^2$

(B) $4 \times 10^6 N/m^2$

(C) $8 \times 10^6 N/m^2$

(D) $16 \times 10^6 N/m^2$

CORRECT OPTION: D

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16 - 9525881

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If Q amount of heat is given to a diatomic gas at constant volume to raise its temperature by ΔT. Then for change of temperature how much amount of heat should be supplied

at constant pressure ?

(A) $\frac{5Q}{7}$

(B) $\frac{7Q}{5}$

(C) Q

(D) $2Q$

CORRECT OPTION: B

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17 - 9525882

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A particle moves in space such that its position vector varies as $\overrightarrow{r} = 2t\hat{i} + 3t^2\hat{j}$. If mass of particle is 2 kg then angular momentum of particle about origin at $t = 2$ sec is

(A) $12\hat{k}$

(B) $48\hat{k}$

(C) $36\hat{k}$

(D) $24\hat{k}$

CORRECT OPTION: B

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18 - 9525883

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A projectile is projected upward with speed $2m/s$ on an incline plane of inclination 30° at an angle of 15° from the plane. Then the distance along the plane where projectile will fall is :

(A) $\frac{4}{15}$

(B) $\frac{4}{5}\left(\frac{1}{\sqrt{3}}-\frac{1}{3}\right)$

(C) $\frac{4}{5}\left(\frac{1}{\sqrt{3}}-\frac{1}{3}\right)$

(D) $\frac{4}{\sqrt{3}}\left(\frac{1}{\sqrt{3}}-\frac{1}{3}\right)$

CORRECT OPTION: C

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19 - 9525885

JEE MAINS 10 APRIL 2019 - PAPER 1 SHIFT 2 - MEMORY BASED - PHYSICS

A solid sphere of mass $m\&$ rdius R is divided in two parts of m mass $\frac{7m}{8}\&\frac{m}{8}$, and converted to a disc of radius $2R\&$ solid sphere of radius $'r'$ respectively. Find $\frac{I_1}{I_2}$, If $I_1\&I_2$ are moment of inertia of disc $\&$ solid sphere respectively

(A) 160

(B) 140

(C) 240

(D) 120

CORRECT OPTION: B

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In $YDSE$ ratio of width of slit is $4:1$, then ratio of maximum to minimum intensity

(A) 9

(B) 27

(C) 3

(D) 81

CORRECT OPTION: A

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21 - 9525887

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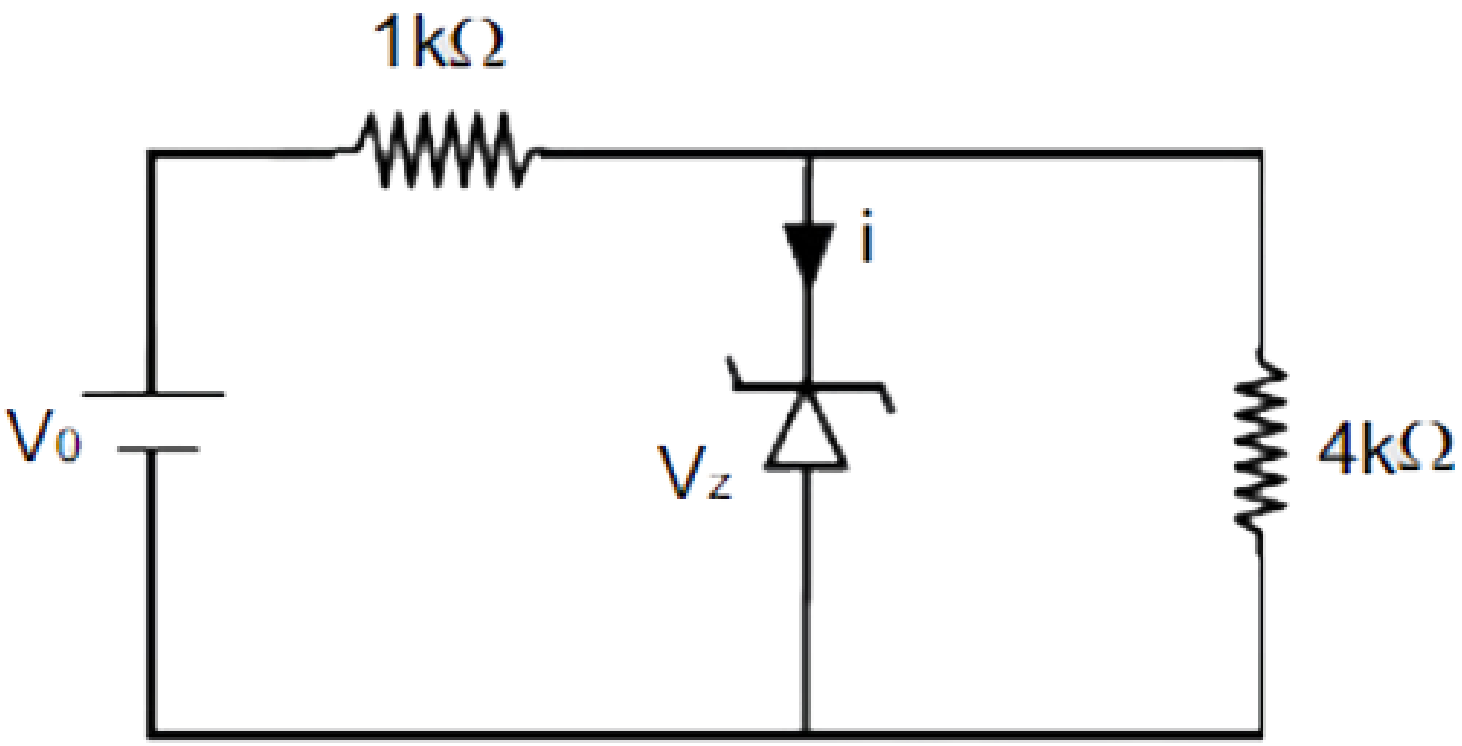
Two charge particle $P\&Q$ having same charge $1\mu C$ and mass $4\mu kg$ are initially kept at the distance of $1mm$. Charge P is fixed, then the velocity of charge parti Q when the separationbetween then becmoes $9mm$.



(A) $3 \times 10^3 m/s$

(B) $2 \times 10^3 m/s$

(C) $5 \times 10^3 m/s$

(D) $7 \times 10^3 m/s$

CORRECT OPTION: B

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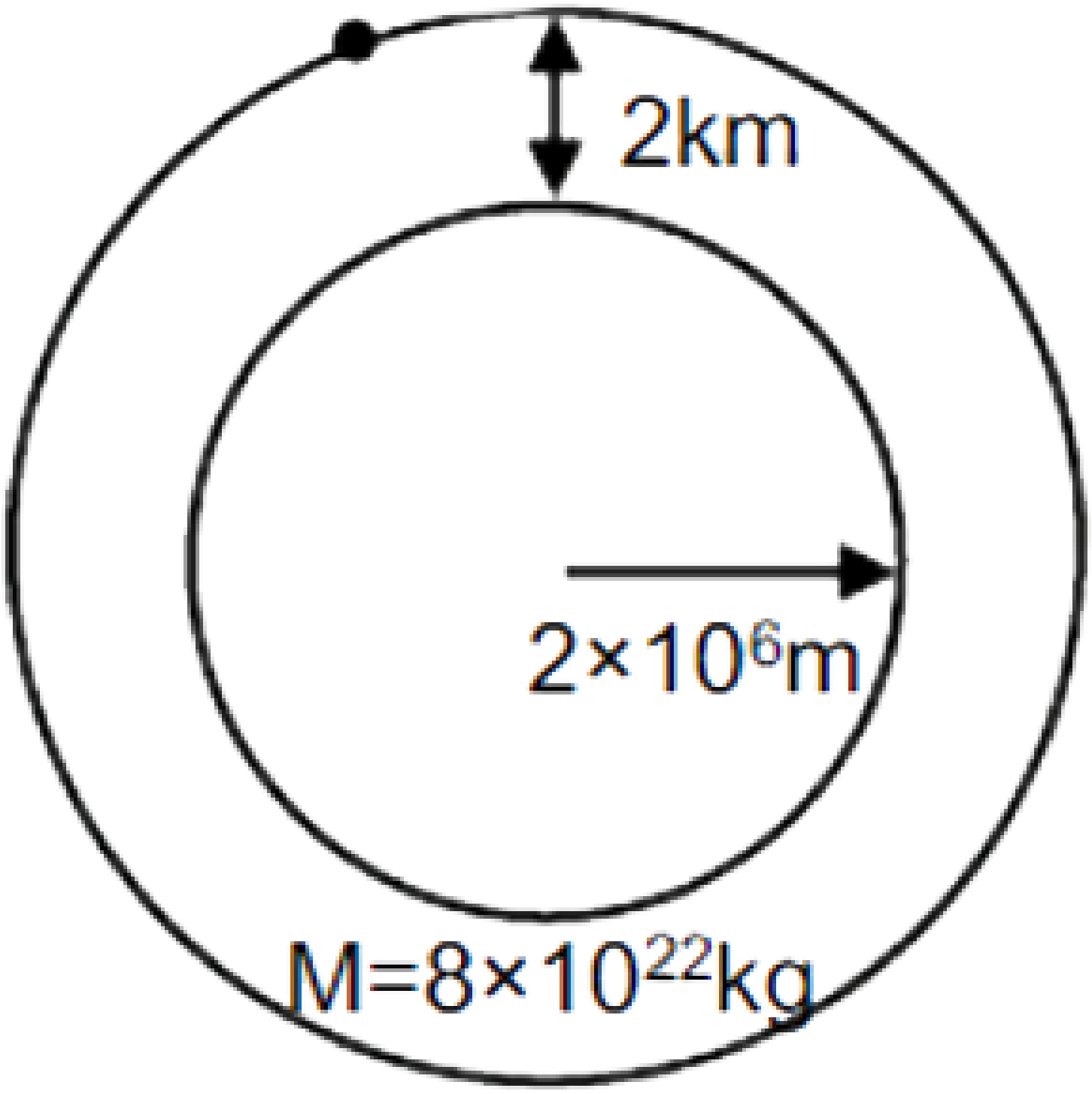
In the circuit diagram of zener diode as shown in figure, when the value of V_0 is 8 volt, the current through zener diode is i_1 and when V_0 is 16 volt, the corresponding current is i_2. Find the value of $(i_2 - i_1)$. (Zener breakdown voltage $V_2 = 6V$)



(A) Zero

(B) $5.0mA$

(C) $1.5mA$

(D) $8mA$

CORRECT OPTION: D

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23 - 9525889

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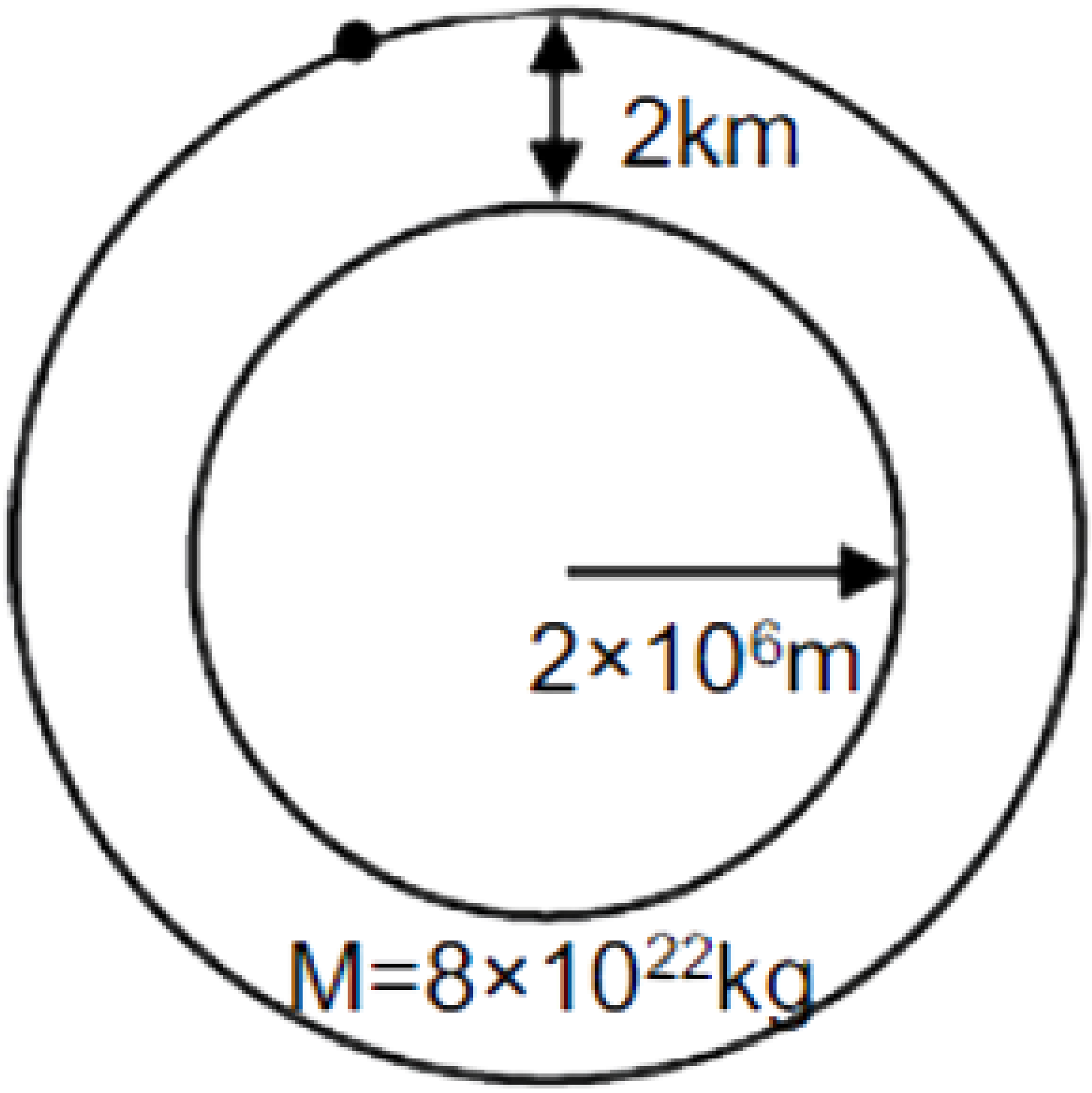
A Satellite is revolving around a planet having mass $M = 8 \times 10^{22} kg$ and radius $R = 2 \times 10^{6} m$ as shown in figure. Find the number of revolutions made by the satellite around the planet in 24 hours.



(A) 9

(B) 10

(C) 11

(D) 12

CORRECT OPTION: C

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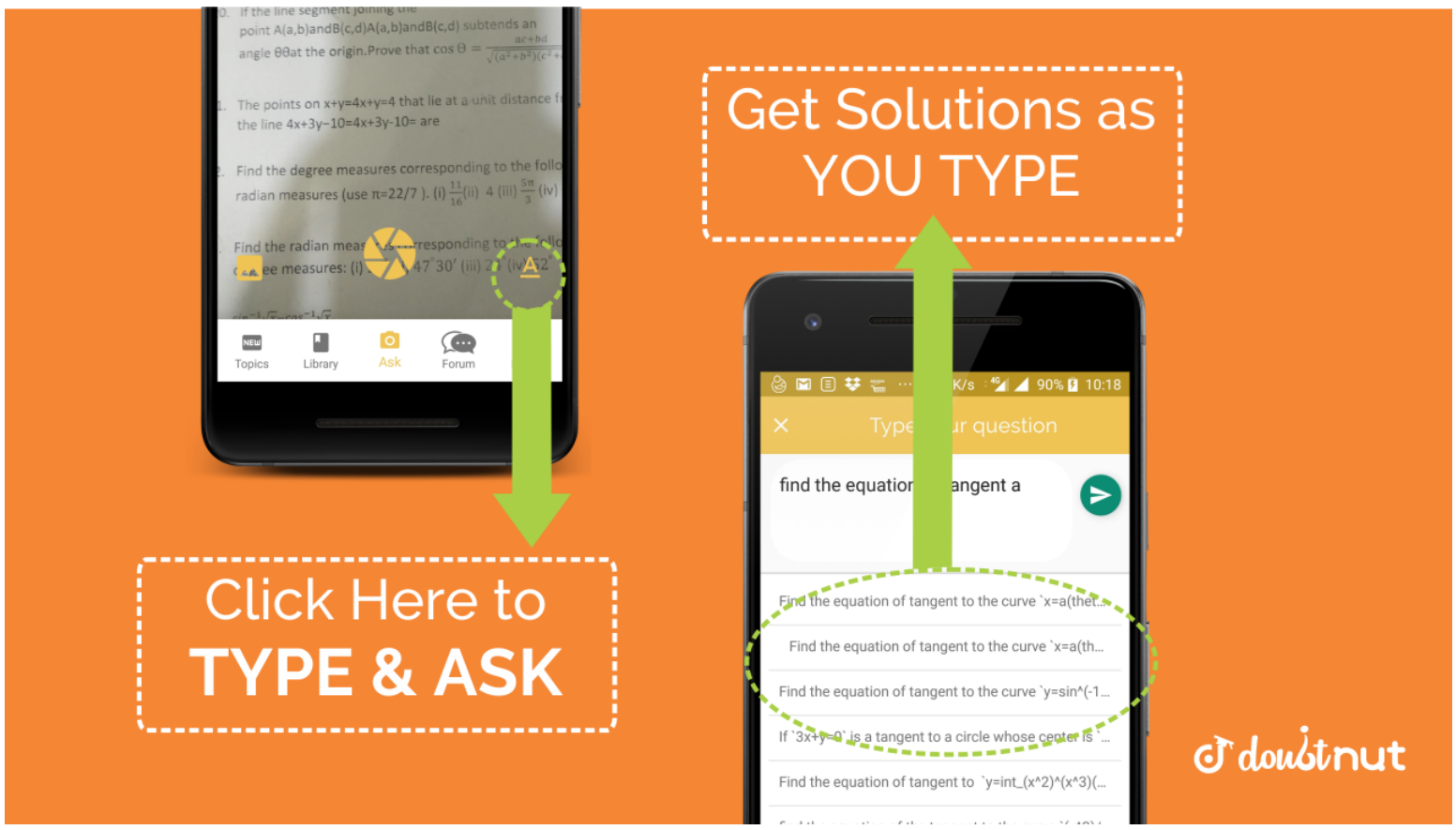

24 - 9525890

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Two radioactive materials have decay constant $5\lambda \& \lambda$. If initially they have same no. of nuclei. Find time when ratio

of nuclei become $\left(\frac{1}{e}\right)^2$:

(A) $\frac{1}{2\lambda}$

(B) $\frac{1}{\lambda}$

(C) $\frac{2}{\lambda}$

(D) $\frac{1}{4\lambda}$

CORRECT OPTION: A

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25 - 9525891

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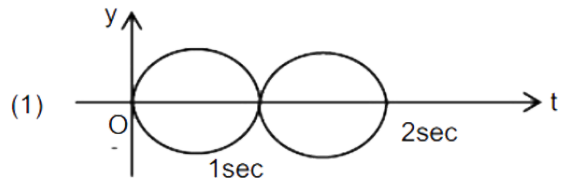
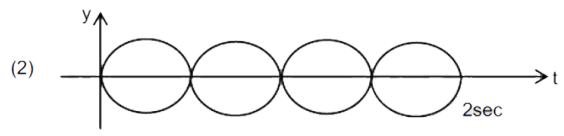
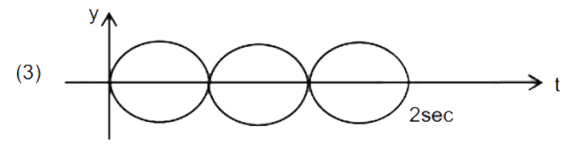
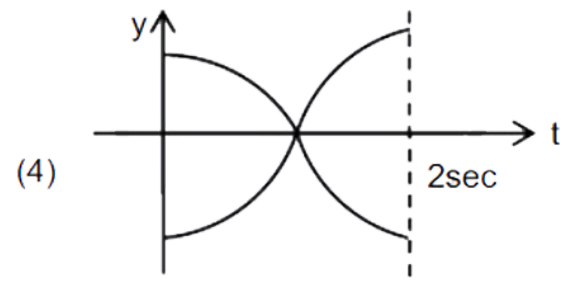
Two sound sources of frequency $9Hz$ and $11Hz$ are sounded together then which plot is correct after superposition of sound waves.

(A) 

(B) 

(C) 

(D) 

CORRECT OPTION: B

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26 - 9525892

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Water is flowing condinuously from a tap of area $10^{-4}m^2$ the water velocity as it leaves the top is $1m/s$ find out area of the water stream at a distance 0.15 m below the top

(A) $0.5 \times 10^{-4}m^2$

(B) $1 \times 10^{-4} m^2$

(C) $2 \times 10^{-4} m^2$

(D) $0.25 \times 10^{-4} m^2$

CORRECT OPTION: A

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Li^{2+} is initially is ground state. When radiation of wavelength λ_0 incident on it, it emits 6 different wavelengths during de excitation find λ_0

(A) $1230 Å$

(B) $510 Å$

(C) $970 Å$

(D) $1480 Å$

CORRECT OPTION: C

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JEE MAINS 10 APRIL 2019 - PAPER 1 SHIFT 2 - MEMORY BASED - PHYSICS

A solid sphere of mass $m\&$ rdius R is divided in two parts of m mass $\frac{7m}{8}\&\frac{m}{8}$, and converted to a disc of radius $2R\&$ solid sphere of radius $'r'$ respectively. Find $\frac{I_1}{I_2}$, If $I_1\&I_2$ are moment of inertia of disc $\&$ solid sphere respectively

(A) 200

(B) 140

(C) 120

(D) 180

CORRECT OPTION: B

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29 - 9525895

A beam of ligh incident on a surface has photons each of energy 1 mJ and intensity $25w/cm^2$. Find number of photons incident per second if surface area of $25cm^2$

(A) $6.25 \times 10^5 s^{-1}$

(B) $8.25 \times 10^5 s^{-1}$

(C) $6.25 \times 10^4 s^{-1}$

(D) $5.25 \times 10^5 s^{1-}$

CORRECT OPTION: A

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